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ABSTRACT

The existence of relationships between a student's score on a personality inventory and his behavior as a teacher at a later time which might facilitate prediction of this behavior was investigated. Seventy students entering the MAT program at Temple University were administered the Minnesota Multiphasic Personality Inventory (MMPI). Six months after the interns began teaching, data on their classroom behavior was collected on two observational instruments (OScAR and Flander's Interaction Analysis). Linear, multiple linear, and curvilinear relationships between the MMPI data and the observational data were studied. Sex differences were also investigated. It was concluded that the MMPI might be useful in predicting future teacher behavior and could be used in conjunction with information obtained from other sources. (TA)

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Using the MMPI to Predict Teacher Behavior

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The purpose of this study was to determine whether relationships exist between a student's scores on a personality inventory and his behavior as a teacher at a later time which might make prediction of this teaching behavior possible.

Procedure

The Minnesota Multiphasic Personality Inventory (MMPI) was administered to seventy students who were entering an M.A.T. program at Temple University. Six months after these interns had started teaching in their own classrooms, the collection of data on their classroom behavior was begun. Each intern was observed four times by the same team of observers over a period of four months. One observer used Medley, Impelleteri, and Smith's Observation Schedule and Record, Form 4V (OScAR 4V) to record this behavior while the second observer used Flanders' Interaction Analysis (IA).

Since OScAR 4V has 42 categories and the IA matrix has 100 cells, an unwieldy amount of data was produced. These data were reduced by performing a factor analysis on the OScAR data and combining the IA cells in various ways to form 42 combinations which were of interest in this study. Scores for each intern on these eight factors and the 42 combinations were used in all subsequent analyses. (See attachment 1 for further explanation of the eight factors used for OScAR 4V and the IA combinations.)

Linear, multiple linear, and curvilinear relationships were studied between the MMPI data and the observational data. Sex differences were also investigated.

Results and Conclusions

Enough significant relationships were found to lend hope to the prospect of being able to use the MMPI as an aid in predicting teachers' behavior. For instance, when the data for the total group were analyzed, prediction equations with significant regression coefficients were obtained through stepwise regression for twenty-eight of the forty-two IA combinations and six of the eight OScAR factors using the .05 level of significance. (See attachment 2.)

Hypochondriasis (Hs), Masculinity-Femininity (Mf), and Depression (D) were found to be the best predictors of classroom behavior for the total group. This result was interesting in light of a study done by Beer (1965) in India in which he found that Hs and Mf were the two MMPI scales which distinguished Education students from other groups.

When the data were analyzed by sex, several interesting relationships were also found. Using the .05 level of significance, prediction equations with significant regression coefficients were found for women for five of the eight OScAR factors and nineteen of the 42 IA combinations; for men, prediction equations with significant coefficients were found for four of the eight OScAR factors and twenty-five of the 42 IA combinations. More

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than half of these significant regression coefficients were still significant at the .01 level. (See Attachment 3.)

Although there were several relationships (e.g., the negative relationship between D and lecturing) which were consistent for all groups studied--total group, men, and women--many sex differences were found. For instance, for women, the best predictors were D, F, and Pt. Although D and F were moderately good predictors for men also, Pt was one of the poorest for them. Conversely, Hs and Mf were the best predictors for men, but Hs was one of the poorest for women.

L, which was a good predictor for men, never appeared in a prediction equation for women, while both F and Pd appeared in prediction equations for both sexes, but for completely different IA combinations.

These findings would seem to present a strong case for studying the relationships between the MMPI and any criterion measure separately for men and women in any future prediction studies of this type, even though there were interesting and significant findings for the total group which should not be ignored.

Throughout the study some significant relationships were found which were in the reverse direction from that expected. (E.g., Hs had a positive relationship with amount of teacher questioning and pupil responding and a negative relationship with lecturing.)

An examination of the raw data revealed that on those MMPI scales where "reverse" relationships occurred most frequently (Hs, D, and Hy), the means for the group fall within what Marks and Seeman (1963) classify as "low" rather than "normal." It may be that in this group the low scores on these scales indicated more abnormality than the high scores. Future researchers using the MMPI might be alerted to the possibility that they may have an abnormally low sample if they are studying a group of teacher trainees, like this group, in which those persons scoring high on the MMPI are excluded from the program.

Several interesting significant curvilinear relationships were also found, especially between some of the MMPI Scales and the IA combinations. (See Attachment 4.)

Implications for Education

In many cases, the point at which a teacher trainee's undesirable behavior (e.g., failure to relate to pupils, excessive criticism or lecturing, etc.) is discovered is when he begins to practice teach or to work with a group of children. At the present time in many teacher training programs, this type of experience comes after the trainee has completed his liberal studies and at least some of his methods courses. When undesirable behavior is discovered in such programs, the institution has only a few quarters or semesters in which to work with the student to change this behavior.

If such behavior could be discovered, or at least predicted earlier, the institution would have more time to change this behavior or to counsel the student into another teaching field or grade level in which such behavior might be more appropriate before both he and the institution have a great investment in his college training.

From this study it would appear that the MMPI might be useful in helping to predict future teaching behavior. Ideally it probably should be used in conjunction with information obtained from other sources, such as observations of the trainee working with small groups of children early in his college career.

The reader should be warned against being "lulled" into the belief that the MMPI (or any other instrument currently published) is a panacea for his prediction problems. If this starts to happen, all one needs to do to realize that such is not the case is to look closely at the actual size of the multiple R's. Although the multiple R's are as large or larger in this study as they are in any other study of this sort, a close examination of their magnitude soon causes one to realize that a great deal of the variance is still unaccounted for in the dependent variable.

(Persons who might elect to use the MMPI for prediction of teacher behavior on the basis of this particular study, should also realize that the percentage of significant relationships between MMPI scales and IA combinations may be somewhat inflated because of the use of some IA cells in more than one IA combination.)

On the basis of the sex effect found in this study, it seems apparent that there probably are other meaningful dimensions upon which differences among teachers exist. (E.g., teaching field or subject matter, grade level, etc.) Studies conducted to produce data to supply prediction equations for particular subdivisions of teachers must be extensive. (See reasons in the section which follows.)

A Word about Observational Studies in General

Although far more data were collected in this study than in the majority of observational studies, the need for even more data was obvious when the frequency distributions of many of the teacher behaviors were examined. Researchers conducting this type of research could easily be misled into believing they had ample data by the total frequencies of the various behaviors. A serious look at the distributions of each of these behaviors can be very startling. For example, the total frequency for Accepting Feelings on IA in this study was 417, a much smaller total than the 61,151 for Lecturing, but on the surface it appeared to be a reasonable amount of data on one behavior. An examination of the distribution for this behavior revealed, however, that the mean was only 5.96 while the standard deviation was 9.57.

An even more extreme example of this problem was the information collected on the behavior called Pupil Statements, Continuing on OScAR 4V. Here the total frequency was 972, but the mean was not quite 14 while the standard deviation was above 48. An examination of the raw data revealed that one intern had a frequency of 358 on this category while nearly 40% of the interns never exhibited this behavior at all during the four observations.

Since these skewed distributions were discovered too late to collect more data, it was hoped that the problem could be alleviated somewhat by transforming the OScAR scores and combining some of the IA cells. Since some of the IA combinations still had skewed distributions, a transformation of these new scores might have been beneficial, although such a

transformation would have added to the difficulty of interpreting the results. At any rate, such a transformation should be considered in future studies if similar conditions arise.

The advantage of having a very large range of frequencies for the behavior under consideration was apparent throughout the study. The IA combinations which most consistently were a part of significant relationships were Indirect-Direct, Teacher-Pupil Talk, Questioning, Lecturing, Pupil Responds, Extended Lecturing, and the Content Cross. These behaviors each had a wide range of frequencies. They were also the IA combinations with the highest frequencies and they each appeared to have an approximate normal distribution. This same phenomenon was evident in the OScAR 4V data.

Obviously in all research studies, there will always be some behaviors which occur less frequently than others. Looking at the problem from a statistical point of view, however, the important thing would seem to be to collect enough data to have a sufficient range of frequencies for the various behaviors being studied to make statistical analysis possible.

Generally speaking, frequent short periods of observation may produce more representative samples of behavior than infrequent, longer periods. In this study, however, it also seems likely that the total observation time per teacher of eighty minutes was far from adequate.

Since observational studies are expensive to conduct, many of them are not as extensive as this study. Considering then the inadequacy of the sample of teachers' behaviors taken in this study, it seems likely that many other studies have also had inadequate samples. This may partially account for the lack of any very definitive findings in the vast majority of observational studies.

References

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Marks, Philip A. and Seeman, William. The actuarial description of abnormal personality: An atlas for use with the MMPI. Baltimore: The Williams and Wilkis Company, 1963.

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Attachment 1

Because of the infrequency of occurrence of some verbal behaviors in this study, the frequencies in some of the OScAR 4V cells were very low. Because of these low frequencies, a logarithmic transformation, $\ln(1 + f_i)$, was performed on the OScAR 4V data. These transformed data and the eight factor scores which were derived from a factor analysis of these transformed scores were used in all subsequent statistical analyses.

Loadings for the OScAR 4V Factors

Factor 1 (Sociable, Noncommittal)
- Describing, Initial .74
- Convergent Interchange, Not Evaluated .67
- Convergent Interchange, Acknowledged .67
- Describing, Continuing .64
- Considering, Initial .58
- Convergent Interchange, Neutrally Rejected .52
- Considering, Continuing .51

Factor 2 (Feedback)
- Elaborating Interchange, Approved .75
- Convergent Interchange, Supported .74
- Elaborating Interchange, Supported .74
- Convergent Interchange, Approved .60

Factor 3 (Rebuking)
- Substantive Pupil-Initiated Interchange, Criticized .69
- Elaborating Interchange, Criticized .62
- Convergent Interchange, Criticized .61
- Rebuking, Initial .60
- Rebuking, Continuing .56
- Nonsubstantive Teacher Initiation, Negative .50

Factor 4 (Divergent Questioning)
- Divergent Interchange, Acknowledged .74
- Divergent Interchange, Approved .72
- Divergent Interchange, Not Evaluated .59
- Divergent Interchange, Supported .58
- Divergent Interchange, Neutrally Rejected .55

Factor 5 (Pupil Involvement)
- Elaborating Interchange, Not Evaluated .75
- Nonsubstantive Pupil Initiation, Negative, .61
- Elaborating Interchange, Acknowledged .60
- Nonsubstantive Pupil Initiation, Positive .51

Factor 6 (Substantive Pupil Initiations)
- Substantive Pupil-Initiated Interchange, Acknowledged .76
- Substantive Pupil-Initiated Interchange, Approved .74
- Substantive Pupil-Initiated Interchange, Neutrally Rejected .58
- Substantive Pupil-Initiated Interchange, Supported .58

Factor 7 (Controlling)
- Directing, Continuing .77
- Directing, Initial .70
- Rebuking, Initial .53

Factor 8 (Teacher Lecturing vs. Inter-Pupil Talking)
Pupil Statement, Initial .71
Informing, Initial -.68
Pupil Statement, Continuing .66
Informing, Continuing -.62

This table includes only those behaviors with a factor loading greater than .50.

With the exception of Silence or Confusion, the usual numbering was used for the Flanders' Interaction Analysis categories:

1. Accepts Feeling
2. Praises or Encourages
3. Accepts or Uses Ideas of Students
4. Asks Questions
5. Lecturing
6. Giving Directions
7. Criticizing or Justifying Authority
8. Student Talk--Response
9. Student Talk--Initiation

Zero was used for Silence or Confusion instead of 10.

Two-digit numbers were used for cells in the matrix. For example, 48 stood for Asks Question followed by Student Response; 60 stood for Giving Directions followed by Silence or Confusion, and so forth.

Each of the forty-two IA combinations included specific cells from the matrix. Some combinations encompassed many cells; others only one or two. For instance, Combination 4 (Accepts Feeling) included all those cells in which 1 was either the first or the second digit; Combination 40 (Overt Resistance) included only 69 and 79; Combination 37 (Negative Feedback) was simply 87.

Many cells appeared in more than one of the 42 combinations.

Attachment 2

MMPI Regression Coefficients for OScAR Factors

Factor	Regression Coefficients	Mult. R
1. Sociable	-.211 F - .070 Ma	.459**
3. Rebuking	.090 Pd - .097 Pa	.331*
4. Divergent Questioning	.035 Mf	.291*
5. Pupil Involvement	.069 Ma	.250*
6. Substantive Pupil Init.	.050 Si - .104 K - .104 Hs - .149 Pd	.422*
8. Teacher Lect. vs Pupil Talk	.049 Mf	.419**

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IA Comb.	Regression Coefficients	Mult. R
1. Indirect-Direct	65.3 Hs + 34.8 D	.426**
3. Teacher-Pupil	-20.4 Mf - 34.5 Sc + 34.2 Ma	.501**
4. 1's	.4 Si + .8 Hy - .6 Ma	.349*
5. 2's	7.9 Hs	.218*
6. 3's	-4.6 Mf	.267*
7. 4's	39.9 Hs - 13.5 Sc	.411**
8. 5's	-30.9 D - 10.1 Mf - 29.5 Hs	.527**
9. 6's	6.8 D	.237*
11. 8's	31.5 Hs	.330**
14. 11+22+33	14.3 F - 6.8 Pt + 7.2 Hy	.406**
16. 55	-34.4 D - 37.0 Hs	.471**
18. 77	-.4 Si + .6 D - .9 Pa - .7 K + .8 Pd	.400*
19. 88+99	28.9 F - 19.5 Ma + 12.7 Sc + 5.5 Mf	.511**
20. 00	-17.4 L + 8.6 D	.319*
21. Indirect Tch. Response	-1.7 Mf + 5.3 Hs	.309*
22. Content Cross	-29.3 D - 10.8 Mf	.510**
23. 48+84	14.2 Hs	.338**
25. 54	-1.2 Mf + 3.6 L - 3.6 F	.528**
26. 40	-2.2 F + 3.1 Hs - 1.3 K	.349*
27. 59	1.8 Sc - 2.0 D	.417**
29. 82	3.3 Hs	.251*
31. 24+34	5.0 Hs	.339**
33. 25+93	-1.2 Mf	.500**
34. 83+93	-2.3 Mf + 4.3 D	.348*
36. 85+95	-2.9 D + 4.1 L + 1.8 Pt	.479**
37. 87	1.2 Hs	.327**
38. 87+97	1.1 Hs	.242*
41. 49+89+98	-2.0 Ma + 2.0 Sc - 1.5 K	.340*

Regression coefficients are non-zero.

The regression coefficients for the OScAR factors and the IA combinations are listed in the same order in which the MMPI scales emerged in the stepwise regression with the best predictor listed first, the best in combination with the first listed second, etc.

N=70

* Significant at the .05 level

** Significant at the .01 level

Attachment 3

MMPI Regression Coefficients for OScAR Factor Scores for Women

Factor	Regression Coefficients	Mult. R
1. Sociable	.110 Mf - .258 F	.662**
2. Feedback	-.248 Pd + .356 Hs + .237 F	.601*
3. Rebuking	.147 Pt - .095 Sc	.473*
5. Pupil Involvement	.174 Ma	.502**
8. Lect. vs Pupil Talk	.231 Pa	.664**

N=27

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MMPI Regression Coefficients for OScAR Factor Scores for Men

Factor		
1. Sociable	-.229 F - .097 Ma	.516**
2. Feedback	.073 K	.365*
3. Rebuking	.102 L -.037 Mf +.119 Pd -.122 Pa	.598**
7. Controlling	.085 Pt	.305*

N=43

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MMPI Regression Coefficients for IA Combinations for Women N=27

IA Comb.	Regression Coefficient	Mult. R
2. indirect-direct	19.2 Ma	.381*
3. Teacher-Pupil	-69.4 Pt - 66.5 D + 51.1 Hy	.739**
4. 's	-1.6 Ma + 1.4 Pd	.566**
5. 2's	25.0 F	.446*
8. 5's	-51.7 D - 29.6 Pt	.641**
9. 6's	7.7 Mf - 9.1 Pd	.480*
12. 9's	50.2 F	.415*
15. 44	10.8 Pa - 6.5 Pt	.480*
16. 55	-34.6 Pt - 32.9 D	.638**
18. 77	-1.4 Ma + 1.6 Pt - 1.0 Sc	.550*
19. 88 + 99	52.9 F - 27.6 Ma	.538*
22. Content Cross	-56.5 D - 30.8 Pt	.626**
27. 59	-4.7 D	.579**
28. 56	.8 Mf - 1.8 Pd + 1.2 Sc	.561*
29. 82	10.9 F + 12.0 Hs - 6.3 Pd	.595*
30. 82 + 92	10.0 F	.427*
32. 23 + 35	-2.2 Si	.392*
36. 85 + 95	-4.3 D	.492**
42. 60	-1.7 Pd + 1.1 Mf	.591**

Attachment 3 (Con't.)

MMPI Regression Coefficients for IA Combinations for Men N=43

IA Comb.	Regression Coefficients	Mult. R
1. Indirect-Direct	75.8 Hs - 38.6 Ma + 34.0 D	.524**
4. 1's	.3 Si + .4 Mf	.442*
6. 3's	14.5 D	.341*
7. 4's	46.2 Hs - 18.8 Sc - 31.5 F	.581**
8. 5's	-25.8 D - 33.7 Hs + 20.5 Ma	.446*
9. 6's	-19.5 L + 10.6 D - 4.0 Mf + 5.4 Pd	.472*
11. 8's	20.4 Pd	.433**
14. 11 + 22 + 33	19.8 F + 14.3 Hy - 10.3 Pd	.571**
15. 44	7.3 Hy - 5.3 Sc	.475**
16. 55	-39.2 Hs	.315*
18. 77	.9 Ma - 1.1 Pa - .3 Si	.512**
20. 00	-12.0 L - 17.6 Sc + 15.3 Pt	.439*
21. Indirect T. Response	5.8 L - 3.7 Mf + 6.6 D	.576**
22. Content Cross	-22.0 D	.312*
23. 48 + 84	-5.9 Mf + 9.3 Pd	.566**
25. 54	-6.1 F + 4.4 L - 1.2 Mf	.599**
26. 40	4.4 Hs - 2.3 Sc	.426*
27. 59	3.2 Sc - 3.0 Hs	.510**
31. 24 + 34	5.3 L + 3.9 Hs	.449*
33. 25 + 35	-1.3 Mf	.448**
34. 83 + 93	6.5 L - 3.6 Mf + 6.3 D	.635**
36. 85 + 95	2.4 Sc - 6.0 F - 4.1 Hy + 2.1 Pd	.643**
37. 87	.6 Hs - .3 Mf + .5 Pd	.552**
38. 87 + 97	-.5 Mf + .8 Pd	.536**
40. 69 + 79	-1.1 F	.309*

Regression coefficients are non-zero.

The regression coefficients for the OScAR factor scores and the IA combinations are listed in the same order in which the MMPI scales emerged in the stepwise regression with the best predictor listed first, the best in combination with the first listed second, etc.

* significant at the .05 level

** significant at the .01 level

Attachment 4

Significant+ Prediction Equations for Curvilinear Relationships between Selected IA Combinations and MMPI Scales

IA Comb.	Prediction Equations	Mult. R
1. Indirect-Direct	$-2{,}098.6 + 227.1\ K - 6.1\ K^2$	.324*
	$-453.3 + 57.0\ Si - 1.8\ Si^2$	.304*
2. indirect-direct	$-236.3 + 35.0\ Mf - .6\ Mf^2$	.352*
3. Teacher-Pupil	$2{,}763.4 - 211.8\ K + 5.8\ K^2$	.299*
	$-60.4 + 93.7\ Mf - 1.8\ Mf^2$	.474**
8. 5's	$2{,}648.1 - 213.5\ K + 6.1\ K^2$	.376*
	$23.6 + 80.8\ Mf - 1.6\ Mf^2$	.505**
11. 8's	$385.2 + 97.0\ K - 2.5\ K^2$	.323*
24. 45	$22.7 + 5.3\ D - 0.2\ D^2$	.311*
	$31.8 + 5.4\ Ma - 0.2\ Ma^2$	.343*
25. 54	$43.0 + 16.6\ D - 0.6\ D^2$	.379**

Only those curvilinear prediction equations which satisfy the formuls, $Y = a + bx + cx^2$ (b and c having opposite signs) are included in this table.

\+ Regression coefficients are non-zero.

* Significant at .05 level

** Significant at .01 level

N = 70